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ABSTRACT

The computer is perhaps the most sophisticated tool mankind has yet developed but it has often been misused with man made to serve the tool rather than vice versa. This paper attempts to examine the genesis of this chaos, contrast the present situation with the ideal, and present a reasonable alternative. A humanized data service in education is possible. Such an alternative could be achieved by realizing that the computer is there to serve the needs of the students and their education, by developing a staff capable of talking to users in their own terms, by carefully assessing users' needs, by considering a system's long-term usefulness, and by taking into account such issues as structure of the data files, non-numeric computing, and rigidity vs. flexibility. This paper cites an example of this type of user orientation in a data processing staff of 18 full-time people serving approximately 50,000 students in 16 independent school districts. One third of the total staff is devoted full time to user coordination and liaison. There is evidence of strong user orientation in the development of user manuals, simple report specifications, a great variety of options on each report, and a network of user committees. (VT)

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HUMAN VALUES IN EDUCATIONAL DATA SYSTEMS

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Perhaps the most sophisitcated tool mankind has yet developed is the computer. This "tool", however, has often been misused and man made to serve the tool rather than vice versa. The paper attempts to examine the genesis of this chaos, contrast the present situation with the ideal, and present a reasonable alternative. Such topics as avoidance of jargon, non-numeric computing, rigidity vs. flexibility, human engineering of systems, and user-oriented DP departments are covered.

Since the inception of awareness in the human mind, mankind has been a prodigious developer of tools. In fact, the ability to develop and use tools is traditionally considered to be a fundamental factor in determining our humanity. One of the most sophisticated tools developed to date, without a doubt, is the computer.

And yet, we are constantly being bombarded with horror tales about that monster, the computer. Was medieval man more frightened by the demons thought to inhabit the edge of the world? But consider: Did primitive man become less human - or more human - when he discovered that his hunting range could be greatly extended by use of a rounded wooden or stone disc which he called "wheel?"

CHAOS FROM LOGIC

Nowhere have we heard the computer decried as thoroughly as within education. Administrators are overwhelmed; teachers feel their job security threatened; parents see their children becoming a number; students are bewildered. How did we-those of us in educational data processing - manage to create such chaos from a tool supposedly dedicated to logic?

GENESIS

First of all, the typical educational data system has developed haphazardly without a thorough, comprehensive analysis prior to implementation. The educational community has neither the technical expertise nor the money to perform such an analysis. The typical commercial service bureau did not (and still, by and large, does not) understand education. The computer has traditionally come into education in a piecemeal fashion. An application is automated when priorities within the district shift to highlight specific problems. Remember the squeaky wheel syndrome?

ENTER THE DP MANAGER

When the information handling situation has reached such a high priority that it is considered fundamental to the functioning of the district, a specialist, the Data Processing Manager, is called in. This individual, often familiar with business applications, rarely has the background in education to effectively rescue things. If the district can afford it, a computer is purchased. If not, they scramble for access to a commercial system. The combination of a resident expert and access to an impressive piece of hardware create a climate of expectation. The requests for services begin to pour in. Lacking a thorough understanding of the needs of education and being basically agreeable, the DP Manager finds it hard to tell anyone "no". Deadlines are set and missed and reset and missed again. Programs do not perform as desired, quite frequently due to faulty communication. The users are intimated by all the new - and often complex - terminology used by the computer people. The computer people, in turn, develop an attitude of condescension toward those poor dumb beings who think a "byte" is a mouthful of Big Mac.

CONTRAST THIS TYPICAL SITUATION TO THE FOLLOWING IDEAL

A school district, recognizing the burden of clerical manipulation of data for payroll, budget, mark reporting, attendance accounting, scheduling, and instructional support makes a firm commitment to computing. They wisely decide to remain with their manual systems while performing a thorough study of their needs. They hire an educational consultant with experience in educational administration as well as data processing, systems analysis, and design. This rare individual spends weeks studying how the district does its business. He holds seminars for everyone from attendance clerks to payroll clerks to classroom teachers to the superintendant. He gradually becomes familiar with the district's needs and the district learns what to expect - and what not to expect - from computerization.

After the initiation of both sides, serious discussion begins. Priorities are set. All systems to be automated are rated as to immediacy. Every attempt is made to stage the development.

Meanwhile, the fiscal state of the district is analyzed to determine how many of the identified goals can be accomplished, both in the near future and on a continuing basis. Does the budget permit the acquisition of personnel and hardware sufficient to handle the needs of the district? A timetable is established for the entire project, probably stretching five years into the future. Alternate methods are investigated in an effort to find the most efficient approach.

If the acquisition of hardware appears to be the best solution, staffing needs are then considered. The first staff member hired is the Data Processing Manager, who is given the authority of an Assistant Superintendant. This individual, like the consultant, is thoroughly familiar with both data processing and education. His salary, of course, is equivalent to that which he could earn in industry. The prior analysis allows the district to present its new staff member with an accurate job description

and plan for what lies ahead. The DP Manager is allowed to hire his staff without interference, unexpected changes in priorities, or fickle support from the district.

System development then begins according to the schedule of priorities. Primary consideration is given to the human interface, recognizing that the computer exists only to supply school district personnel with timely, accurate, useful information. Each subsystem is carefully analyzed to determine who it is to serve. Each program is written with one goal in mind: make the system do the work, not the user. Adequate precautions are taken to develop a system that will be considered reliable by its users.

WOULDN'T IT BE NICE?

Realistically, of course, we must face the fact that most educational users of computing are already somewhere along the way to chaos. One reason seems to be that, while we have all heard the adage "A little knowledge is a dangerous thing," the data processing community rarely considers the impact on the user of having to deal with too much. Quite frequently it is the quantity of data, not its usefullness, that is considered. No one asks the user if he really needs all that information. To be more precise, nobody talks to the user, period - at least not at a level where true communication could occur.

WHAT CAN BE DONE

There are alternatives, however. First of all, the computer center people must realize that the piece of hardware they refer to as "Our Computer" is not theirs at all. It belongs, legally and correctly, to the school system it serves. It does not exist for the programmers' ego gratification. Similarly, the school district administration must realize that the computer does not exist to produce elegant documents to impress the school board. What the computer in an educational data center does exist for is the education of the school system's students. This it can do directly, for example, through CAI or problem solving by students. It can also reduce the burden of manual information handling upon the administrative support staff, freeing them for the necessary human interaction with students, parents, teachers, and administrators.

Secondly, the data center should develop a staff capable of talking to users in their own terms. In particular, it is a wise investment to assign as many staff members as necessary to full-time user liaison. This delicate position requires two capabilities usually considered mutually exclusive: (1) the ability to talk to users in non-technical terms and yet make them comprehend the limitations and possibilities of the technology, and (2) the ability to talk to the technical staff in the dialect they understand, concisely defining the user's needs.

Program development must be carefully considered. As with any systems analysis project, the end result should be the starting point; first determine exactly what it is the user needs. Quite frequently this requires a great deal of tactful probing by the liaison for often the user

is not certain what he does need or how it can be implemented. And rarely will the user volunteer long-range goals that can significantly influence the future use of the system.

Program extensibility and modularity of design are key issues for the technical staff when considering a system's long-term usefulness. It is very easy, after a few years' operation, to have created a program library monster, containing hundreds of tiny, single-purpose programs and a few very large programs. In either case, program changes, documentation, and job request specification are monstrous tasks. A much more reasonable approach is to create structured programs of moderate size, each program dedicated to a principle or function within the overall system. It then becomes a straight-forward matter to maintain, augment or modify a program. Most programming requests will naturally fall in place - if accurate long-range goals were established.

The structure of the data files is also critical. With data base management systems readily available for most computer systems there is little reason to expend the space and time necessary to maintain a multitude of separate files. Program design is also simplified when any program has available all elements of the data record and when one item, such as student name, does not occur in several places.

It should not be forgotten that the computer is not restricted to numeric uses. It is unnecessary and shortsighted to attempt to quantify everything. Upon occasion it is refreshing to see a computer-generated report that does not contain a student ID number. Parents react much more favorably to a communication from the school addressed to "Mr. and Mrs. John Smith" than to something that comes "TO THE PARENTS OF STUDENT 913768." Similarly, with the investment of very little time it is possible to print student names without a multitude of spaces between first and last name, narrative reports rather than page after page of columns, and dates that are decipherable.

There is a precarious balance between rigidity and flexibility. On the one hand, the operations staff must have a sane and orderly structure. On the other hand, why should it be necessary to tell one school building that they must receive their student report cards sorted alphabetically within grade level just because everyone else does? Here again, the liaison staff is invaluable. Parameter specifications can be handled on a personal, non-technical level for the user and yet be precisely coded for operations.

ONE PRACTICAL EXAMPLE

This type of user orientation has been implemented. We at Educational Service Unit #3 in Omaha, Nebraska, have a data processing staff of 18 full-time people serving approximately 50,000 students in 16 independent school districts. Our applications are divided into three areas: Student Information Services (master file maintenance, scheduling, mark reporting, and attendance accounting), Business Information Services (budget, payroll, personnel, and inventory), and Instructional Services (problem solving and CAI usage in the classroom). Six of our staff

members - one third of the total - are devoted full time to user coordination and liaison. Our approach has included the development of user manuals, simple report specifications, a great variety of options on each report, and a network of user committees to keep us informed of the needs of the districts.

While there undoubtedly are other approaches that provide the user a timely, accurate, useful system, we have found reliance on a strong liaison staff invaluable. In addition, the application of structured programming and the use of date base management techniques have greatly enhanced the continuing effectiveness of the system. Our experience has shown that a humanized data service in education is possible.